The following listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (Original) A gene-delivery compound comprising: (A) a single-chain binding polypeptide having at least one effector segment which includes at least one cysteinyl residue; and (B) a nucleic acid-binding moiety which is coupled to said polypeptide by said residue.

2. (Original) The compound of Claim 1 having a binding region which is effective in binding a surface marker of a mammalian cell wherein said binding region comprises a single-chain Fv protein.

3 (Original) A composition comprising the compound of claim 1 and a nucleic acid associated reversibly with said moiety.

4. (Original) The compound of claim 1 wherein said polypeptide is effective in binding a surface marker of a mammalian cell.

5. (Original) The compound of claim 4 wherein said marker is a tumor antigen.

6. (Original) The compound of claim 5 wherein said marker is selected from the group consisting of erbB-2, erbB-3, erbB-4, p53, p21 ras, transferrin receptor, Lewis Y antigen, carcinoembryonic antigen,

epidermal growth factor, MUC1, and any other tumor-associated or tumor-specific antigen.

7. (Original) The compound of claim 1 wherein said nucleic acid-binding moiety is selected from the group consisting of salmon protamine, subfragments of salmon protamine, human histone H1, subfragments of human histone H1, human protamine, subfragments of human protamine, HMG, polylysine or any other DNA binding polypeptide.

8. (Original) The compound of claim 7 wherein the nucleic acid-binding moiety is salmon protamine.

9. (Original) The compound of claim 1 further comprising an additional effector segment that binds reversibly with nucleic acids.

10. (Original) The compound of claim 1 further comprising an additional effector segment that facilitates endosomal escape or avoidance.

11. (Original) The compound of claim 1 further comprising an additional effector segment that facilitates non-endosomal transport in a cell.

12. (Original) The compound of claim 1 further comprising an additional effector segment that facilitates entry into the nucleus of a targeted cell.

13. (Original) The compound of claim 9 wherein said additional effector segment is a human histone H1 peptide sequence.

14. (Currently amended) The compound of claim 10 wherein said additional effector segment comprises the carboxyl-terminal sequence that binds to the KDEL receptor in the Golgi, SEKDEL [SEQ ID NO. 51].

15. (Currently amended) The compound of claim 12 wherein said additional effector segment comprises the SV40 large T antigen nuclear localization sequence, TPPKKKRKV [SEQ ID NO. 30].

16. (Original) The compound of claim 1 further comprising at least one spacer sequence.

17. (Original) The compound of claim 16 further comprising at least one spacer sequence located between said effector segment containing said cysteinyl residue and an additional effector segment.

18. (Currently amended) The compound of claim 17 wherein said spacer sequence comprises at least one (Ser_4Gly) [SEQ ID NO. 52] or (Gly_4Ser) [SEQ ID NO. 53] segment.

19. (Currently amended) The compound of claim 18 comprising two (Ser_4Gly) [SEQ ID NO. 52] or (Gly_4Ser) [SEQ ID NO. 53] segments.

20. (Original) The compound of claim 1 including a heterobifunctional crosslinking agent which couples said cysteinyl residue to said nucleic acid-binding moiety.

21. (Original) The compound of claim 20 wherein said heterobifunctional crosslinking agent is selected from the group consisting of succinimidyl *trans*-4(maleimidylmethyl)-cyclohexane-1-carboxylate (SMCC) and sulfoSMCC.

22. (Original) The composition of claim 3 wherein said nucleic acid comprises DNA encoding a therapeutic gene.

23. (Original) The composition of claim 22 wherein said therapeutic gene is a lymphokine.

24. (Original) The composition of claim 22 wherein said therapeutic gene is tumor necrosis factor.

25. (Original) The composition of claim 22 wherein said therapeutic gene is an intrabody.

26. (Original) The composition of claim 22 wherein said therapeutic gene is selected from the group consisting of tumor suppressor genes, p53, proapoptotic genes, suicide genes, prodrug converting genes, HSV-TK and anti-angiogenic genes.

27. (Original) The compound of claim 1 comprising C6ML3-9 sFv'-H1.

28. (Original) The compound of claim 1 comprising C6ML3-9 sFv'-P1.

29. (Original) The compound of claim 1 comprising C6ML3-9 sFv'-SP.

30. (Original) A gene-delivery compound comprising: (A) a single-chain binding polypeptide having at least one effector segment which includes at least one cysteinyl residue; and (B) a lipid-associating moiety which is coupled to said polypeptide by said residue.

31. (Original) A gene-delivery composition comprising the compound of claim 30 and a liposome in association with said lipid-associating moiety.

32. (Original) The composition of claim 31 further comprising a nucleic acid in association with said liposome.

33. (Original) The compound of claim 30 wherein said polypeptide is effective in binding a surface marker of a mammalian cell.

34. (Original) The compound of claim 33 wherein said marker is a tumor antigen.

35. (Original) The compound of claim 34 wherein said marker is selected from the group consisting of erbB-2, erbB-3, erbB-4, p53, p21 ras,

transferrin receptor, Lewis Y antigen, carcinoembryonic antigen, epidermal growth factor, MUC1, and any other tumor-associated or tumor-specific antigen.

36. (Original) The compound of claim 30 wherein said lipid-associating moiety is selected from the group consisting of linear, branched, cyclic, and polycyclic compounds capable of insertion into and retention of lipid-containing compositions.

37. (Original) The compound of claim 36 wherein said moiety contains polyethylene glycol (PEG).

38. (Original) The compound of claim 36 wherein said moiety is maleimide-PEG-$(C_{18})_2$.

39. (Original) The compound of claim 37 wherein the PEG portion of said maleimide-PEG-$(C_{18})_2$ has about 10 to about 100 oxyethyl units.

40. (Original) The composition of claim 31 wherein said polypeptide is located on the surface of said liposome.

41. (Original) The composition of claim 31 wherein said liposome is a stealth liposome.

42. (Original) The compound of claim 30 further comprising an additional effector segment capable of associating with nucleic acid.

43. (Original) The compound of claim 30 further comprising an additional effector segment that facilitates endosomal escape.

44. (Original) The compound of claim 30 further comprising an additional effector segment that facilitates non-endosomal transport in the cell.

45. (Original) The compound of claim 30 further comprising an additional effector segment that facilitates entry into the nucleus of a targeted cell.

46. (Original) The compound of claim 42 wherein said additional effector segment comprises a human histone H1 peptide sequence.

47. (Currently amended) The compound of claim 43 wherein said additional effector segment comprises the carboxyl-terminal sequence that binds to the KDEL receptor in the Golgi, SEKDEL [SEQ ID NO. 51].

48. (Currently amended) The compound of claim 45 wherein said additional effector segment comprises the SV40 large T antigen nuclear localization sequence, TPPKKKRKV [SEQ ID NO. 30].

49. (Original) The compound of claim 30 further comprising at least one spacer sequence located between said effector segment containing said cysteinyl residue and an additional effector segment.

50. (Currently amended) The compound of claim 49 wherein said spacer sequence comprises at least one (Ser_4Gly) [SEQ ID NO. 52] or (Gly_4Ser) [SEQ ID NO. 53] segment.

51. (Currently amended) The compound of claim 50 comprising two (Ser_4Gly) [SEQ ID NO. 52] or (Gly_4Ser) [SEQ ID NO. 53] segments.

52. (Original) The compound of claim 1 comprising a single-chain binding polypeptide which is effective in binding two or more surface markers of a mammalian cell.